Based on car collision data in California for years 2019-2020, get an estimate of when the pandemic started

In [1]:
```
import pandas as pd
```

In [2]:
```
#Reading the data into a dataframe
#Note-data source not on GitHub

car_collisions=pd.read_csv("Downloads/datascience_interview_data/california_car_
```

In [3]:
```
#viewing the dataframe
car_collisions.head(5)
```

Out[3]:

	case_id	jurisdiction	officer_id	reporting_district	chp_shift	population	county_city_location
0	81715	1941.0	11342	212	5	7	1941.0
1	726202	3600.0	8945	064	5	5	3612.0
2	8008498	3604.0	975	NaN	5	6	3604.0
3	8008502	3000.0	5163	951J2	5	5	3040.0
4	8008506	1942.0	27792	1541	5	7	1942.0

5 rows × 74 columns

In [4]:
```
#Dataframe information
car_collisions.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 577859 entries, 0 to 577858
Data columns (total 74 columns):
 #   Column                          Non-Null Count   Dtype
---  ------                          --------------   -----
 0   case_id                         577859 non-null  int64
 1   jurisdiction                    576588 non-null  float64
 2   officer_id                      577257 non-null  object
 3   reporting_district              227895 non-null  object
 4   chp_shift                       577859 non-null  int64
 5   population                      577859 non-null  int64
 6   county_city_location            577858 non-null  float64
 7   special_condition               577858 non-null  float64
 8   beat_type                       577858 non-null  float64
 9   chp_beat_type                   577858 non-null  object
 10  city_division_lapd              40545 non-null   object
 11  chp_beat_class                  577858 non-null  object
 12  beat_number                     538939 non-null  object
 13  primary_road                    577858 non-null  object
 14  secondary_road                  577857 non-null  object
 15  distance                        577858 non-null  float64
 16  direction                       428093 non-null  object
 17  intersection                    573141 non-null  float64
 18  weather_1                       575939 non-null  object
 19  weather_2                       19419 non-null   object
 20  state_highway_indicator         577618 non-null  float64
```

```
 21  caltrans_county                  16728 non-null   object
 22  caltrans_district                16728 non-null   float64
 23  state_route                      16728 non-null   float64
 24  route_suffix                     10 non-null      object
 25  postmile_prefix                  3294 non-null    object
 26  postmile                         16727 non-null   float64
 27  location_type                    16728 non-null   object
 28  ramp_intersection                9608 non-null    float64
 29  side_of_highway                  16714 non-null   object
 30  tow_away                         567167 non-null  float64
 31  collision_severity               577848 non-null  object
 32  killed_victims                   577858 non-null  float64
 33  injured_victims                  577858 non-null  float64
 34  party_count                      577858 non-null  float64
 35  primary_collision_factor         576277 non-null  object
 36  pcf_violation_code               34 non-null      object
 37  pcf_violation_category           574290 non-null  object
 38  pcf_violation                    545249 non-null  float64
 39  pcf_violation_subsection         210891 non-null  object
 40  hit_and_run                      577858 non-null  object
 41  type_of_collision                573395 non-null  object
 42  motor_vehicle_involved_with      575037 non-null  object
 43  pedestrian_action                577534 non-null  object
 44  road_surface                     574101 non-null  object
 45  road_condition_1                 574518 non-null  object
 46  road_condition_2                 3841 non-null    object
 47  lighting                         575790 non-null  object
 48  control_device                   574775 non-null  object
 49  chp_road_type                    577858 non-null  float64
 50  pedestrian_collision             19474 non-null   float64
 51  bicycle_collision                14378 non-null   float64
 52  motorcycle_collision             19132 non-null   float64
 53  truck_collision                  33881 non-null   float64
 54  not_private_property             577858 non-null  float64
 55  alcohol_involved                 59250 non-null   float64
 56  statewide_vehicle_type_at_fault  475425 non-null  object
 57  chp_vehicle_type_at_fault        468260 non-null  float64
 58  severe_injury_count              577858 non-null  float64
 59  other_visible_injury_count       577858 non-null  float64
 60  complaint_of_pain_injury_count   577858 non-null  float64
 61  pedestrian_killed_count          577858 non-null  float64
 62  pedestrian_injured_count         577858 non-null  float64
 63  bicyclist_killed_count           577858 non-null  float64
 64  bicyclist_injured_count          577858 non-null  float64
 65  motorcyclist_killed_count        577858 non-null  float64
 66  motorcyclist_injured_count       577858 non-null  float64
 67  primary_ramp                     344 non-null     object
 68  secondary_ramp                   4201 non-null    object
 69  latitude                         357449 non-null  float64
 70  longitude                        357449 non-null  float64
 71  collision_date                   577858 non-null  object
 72  collision_time                   572491 non-null  object
 73  process_date                     577858 non-null  object
dtypes: float64(35), int64(3), object(36)
memory usage: 326.2+ MB
```

In [5]:
```
#Consider collision_date column-Estimation is that the pandemic started approxim

car_collisions['collision_date']
```

Out[5]:
```
0         2020-03-14
1         2020-07-26
2         2019-05-14
3         2019-04-30
```

```
4          2019-05-29
              ...
577854     2020-02-23
577855     2020-02-24
577856     2020-02-23
577857     2020-02-27
577858            NaN
Name: collision_date, Length: 577859, dtype: object
```

In [6]:
```
#Consider rows which don't have null values
new_collision_data=car_collisions[car_collisions['collision_date'].notna()]
```

In [7]:
```
#View dataframe without null values in the collision_date column
new_collision_data
```

Out[7]:

	case_id	jurisdiction	officer_id	reporting_district	chp_shift	population	county_city_loc
0	81715	1941.0	11342	212	5	7	
1	726202	3600.0	8945	064	5	5	3
2	8008498	3604.0	975	NaN	5	6	3
3	8008502	3000.0	5163	951J2	5	5	3
4	8008506	1942.0	27792	1541	5	7	1
...	...	...	...	...	...	...	
577853	91200523	9265.0	022134	NaN	3	9	3
577854	91200524	9720.0	021806	NaN	3	9	4
577855	91200525	9855.0	014980	NaN	1	5	3
577856	91200526	9840.0	021037	NaN	3	7	3
577857	91200527	9670.0	014558	NaN	1	7	3

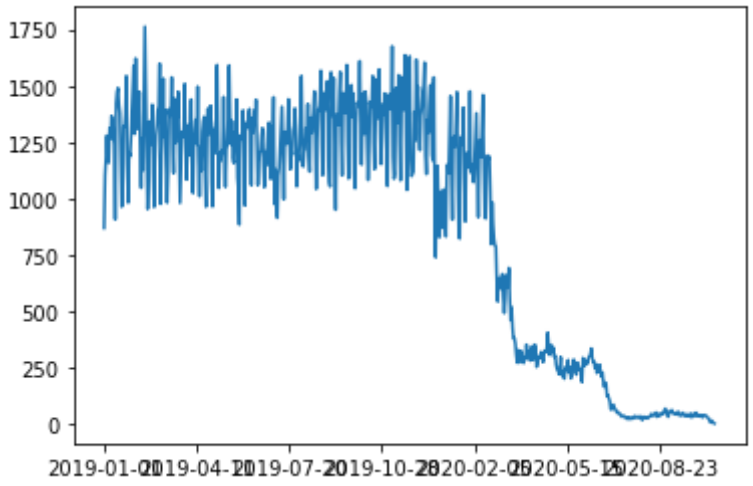
577858 rows × 74 columns

In [8]:
```
#Confirming that the new dataframe doesn't have null values in the collision_dat
new_collision_data['collision_date'].isnull().sum()
```

Out[8]: 0

In [9]:
```
#visualize the data and estimate the date based on the sharp decline in the numb
new_collision_data['collision_date']. value_counts().sort_index().plot()
```

Out[9]: <AxesSubplot:>


1750
1500
1250
1000
750
500
250
0
2019-01-20
2019-04-10
2019-07-20
2019-10-28
2020-02-05
2020-05-15
2020-08-23